AUTHOR INDEX TO VOLUME 34

References with (A) are to abstracts of papers presented at meetings of the Physical Society and references with (L) are to Letters to the Editor.

Adams, Arthur S. Adsorption of air on glass as a function of temperature—1438
Adams, Elliot G. Capture of electrons by α-particles—537(L)
Ader, O. B. Extension and period of a conically wound spring—656
Allison, Samuel K. Experimental evidence for filling of electron levels from relative intensity of x-ray spectrum lines—7
——— Resolution of line $L\beta_2$ into its diagram components and relative widths of some x-ray spectrum lines—176
Almy, G. M. and **F. H. Crawford.** Zeeman effect in MgH bands—1517
Anderson, Carl D. Spatial distribution of photoelectrons ejected from a gas by x-rays —547(A)
Andrews, Donald H. Frequency distribution in Raman spectra—1626(L)
Armstrong, Alice H. X-ray diffracting power of copper and iron for molybdenum and copper radiation—931
——— Intensity of reflection of x-rays from diamond—1115
Astin, Allen. A new method for measuring the dielectric constants of conducting liquids—300

Babcock, Harold D. Relative abundance of the isotopes of oxygen—540(A)
Bacher, R. F. (see Goudsmit, S)—1501, 1499(L)
Bainbridge, K. T. A search for element 87 by analysis of positive rays—752
Barnes, A. H. (see Davis, Bergen)—152
——— Capture of electrons by alpha-particles—1229(L)
Barnes, B. T. Total radiation from polished and from soot-covered nickel—1026
Bartlett, James H., Jr. Relative intensities of nebular lines—1247
Barton, Henry A. A new regularity in the list of existing nuclei—1228(L)
Bates, John R. (see Urey, H. C.)—1541
Bauer, H. (see Jauncey, G. E. M.)—387
Beattie, James A. Heat capacities of real gases and mixtures of real gases—1615
Becker, J. A. Book reviews—820, 1291
——— Phenomena in oxide-coated filaments —1323
Berger, C. E. Effect of light on electron emission from cerium dioxide—1566
Birge, Raymond T. Further evidence of the carbon isotope, mass 13—379(L)
——— Heat of dissociation of oxygen and of nitrogen—1062(L)
——— (see King, Arthur S.)—376(L)
Black, J. G., W. G. Nash and **C. A. Poole.** Influence of argon and of hydrogen on spectra of zinc vapor—1138
——— (see Duffendack, O. S.)—35
Black, N. Henry. Book review—1291
Bleakney, Walker. A new method of positive ray analysis and its application to the measurement of ionization potentials in mercury vapor—157
Bourgin, D. G. Sound propagation in gas mixtures—521
Bowen, I. S. Additional series lines in spectra of C II and N II—534
——— Low energy states in C II and N II —540(A)
Bozorth, Richard M. Barkhausen effect in iron, nickel and permalloy. I. Measurement of discontinuous change in magnetization—772
Bramley, A. Scattering of light by Kerr cell—1061(L)
Brasefield, Charles J. Densities of hydrogen spectral lines as a function of electronic velocity of excitation—431
——— Nature of electrodeless ring discharge —1392(L), 1627(L)
Brattain, Walter H. Efficiency of excitation by electron impact and anomalous scattering in mercury vapor—474
Breit, G. Effect of retardation on interaction of two electrons—375(L), 553
——— On the possibility of nuclear disintegration by artificial sources—817(L)

Breit, G. A Correction to "The Propagation of Schroedinger Waves in a Uniform Field of Force"—1491
Brice, Brooks A. Double vibrational isotope effect in silver chloride band spectrum —1227(L)
Bridgeman, Oscar C. Joule-Thomson effect and heat capacity at constant pressure for air—527
Bridgman, P. W. Book reviews—383, 819, 998, 1230
——— General consideration on emission of electrons from conductors under intense fields—1411
Brode, Robert B. Absorption coefficient for s'ow electrons in alkali metal vapors—673
Bryan, A. B. Dielectric constants of argon and neon—615
Buchta, J. W. Book reviews—1395, 1396
Burns, Laurence. (see Stockbarger, Donald C.)—1263
Burroughs, R. E. A phenomenon observed in a rotary spark gap—161(L)
Busang, P. F. (see Smith, W. O.)—1271
Byck, Harold T. On a resonance-fluorescence phenomenon in cyanogen spectrum—453

Cabannes, Jean. Change in wave-length by molecular scattering—1497(L)
Campbell, James R., Jr. (see Race, Hubert H.)—1031
Carman, A. P. and **K. O. Smith.** Dielectric constants of three electrolytes by a static balance electrometer method—1042
——— **O. B. Young** and **K. O. Smith.** A static balance electrometer method of measuring dielectric constants of electrolytes—1040
Cassen, Benedict. Symmetry of nuclear wave functions—1061(L)
Caswell, A. E. New graphical arrangement of periodic table—543(A)
Chandrasekhar, S. Generalized form of new statistics—1204
Chase, Carl T. A test for polarization in a beam of electrons by scattering—1069
Christensen, Carl J. and **G. K. Rollefson.** A high intensity non-reversed sodium arc —1154
——— Influence of method of excitation on transition probabilities in sodium vapor —1157
Christy, Andrew. A new titanium band system—539(A)
Colby, W. F. Analysis of the HCl bands—53
Condon, E. U. Book reviews—1065, 1230
Constant, F. W. Magnetic properties of isolated ferromagnetic atoms—548(A), 1217
Cook, F. W. Photoelectric cell for use in erythema—1287(L)
Cook, S. G. Surface tension of mercury in presence of gas under varying pressures —513
Cook, S. R. Preliminary note on coefficients of relativity—549(A)
Cox, Irwin W. Scattering of positive lithium ions in mercury vapor—1426
Cox, R. T. (see Myers, Frank E.)—1067
Crawford, F. H. (see Almy, G. M.)—1517
Curtiss, L. F. Nature of cosmic radiation —1391(L)

Daily, C. R. Electric moments of CH_3 and Br radicals in certain organic molecules —548(A)
Daugherty, J. Fenton. Infra-red absorption spectra of benzene and its halogen derivatives—1549
Davis, Bergen and **A. H. Barnes.** Capture of electrons by swiftly moving alpha-particles —152
——— and **Harris Purks.** Fine structure in Compton effect—1
——— Unusual reflecting power of a pair of calcite crystals—181
Dawson, L. H., L. P. Granath and **E. O. Hulburt.** Attenuation of ultra-violet light by lower atmosphere—136
——— and **Joseph Kaplan.** Comet-tail bands—379(L)
Delsasso, L. P. An electro-mechanical frequency analyzer—550(A)
Dempster, A. J. Reflection of protons from crystals—1493(L)
Dershem, Elmer. Reflection of $K\alpha$ line of carbon from glass—1015
Dewar, Margaret. (see Kirkpatrick, Paul) —549(A)
Dennison, D. M. Book review—1395
Dickinson, R. G., R. T. Dillon, and **F. Rasetti.** Raman spectra of polyatomic gases —582
Dillon, R. T. (see Dickinson, R. G.)—582
Dodd, L. E. Field of view of secondary image, with point-object stationary, for two independently variable plane mirrors having limited widths—543(A)
——— A heavy electromagnetic pendulum for use as a self-regulating motor—545(A)
Duffendack, O. S. and **J. G. Black.** Studies on spectra of Cu I, Cu II, and Mn II by means of vacuum tungsten furnace—35

Duffendack, O. S. and **H. L. Smith.** Simultaneous ionization and excitation of diatomic molecules by impacts with positive ions and excited atoms—68
——— and **R. A. Wolfe.** Excitation of arc spectrum of nitrogen—409
———, **Clement L. Henshaw,** and **Marie Goyer.** The excitation of the Mg II spectrum by impacts of second kind with metastable atoms and ions of rare gases —1132
Duncan, James F. Experimental study of certain electronic bands of CO_2—1148
Dunham, J. L. Intensities in harmonic band of hydrogen chloride—438
Dunnington, Frank G.—(see Lawrence, E. O.) 1624(L)

Easley, M. A. (see Spence, B. J.)—730
Eckart, Carl. Continuous x-ray spectrum —167
Edlefsen, N. E. (see Lawrence, Ernest O.) —233, 1056
Ellett, A., H. F. Olson, and **H. A. Zahl.** Reflection of atoms from crystals—493
Ellis, Joseph W. Vibration spectrum of ammonia molecule—539(A)
Engwicht, Harry. Relative intensities of lines in a generalized multiplet of Ti II —541(A)
Erikson, Henry A. Factors affecting nature of ions in air—635
Evjen, H. M. Energy changes by a variation from crystallographic group—1385

Farnsworth, H. E. Electron emission and diffraction by a copper crystal—679
Feather, N. Status of γ-ray change—1558
Focke, A. B. (see Goetz, A.)—546(A)
Foote, Paul D. (see Smith, W. O.)—1271
Found, Clifton G. Electron emission by metastable atoms—1625(L)
Frank, A. (see Van Vleck, J. H.)—1494, 1625(L)
Frayne, John G. Influence of foreign gases on intensities of magnesium resonance lines 5471 and 2852—546(A), 590
Frazer, J. H. Adsorption of air and water vapor on rock-salt surfaces—644
Fredrickson, W. R. Rotational structure of red bands of sodium—207
Freed, Simon and **Frank H. Spedding.** Line absorption spectra of solids at low temperatures in visible and ultra-violet regions of spectrum—945
Frerichs, Rudolf. New terms in oxygen arc spectrum—1239

Gartlein, C. W. (see Gibbs, R. C.)—406
Gaviola, E. Remarks on efficiency of quenching collisions and radius of excited mercury atom—1049
——— On life and concentration of metastable atoms and quenching of mercury resonance radiation—1373
Gibbs, R. C. and **Alice M. Vieweg.** Extension of Cd I-like iso-electronic sequences to Sb IV and Te V—400
——— **Alice M. Vieweg,** and **C. W Gartlein.** Use of series inductance in vacuum spark spectra—406
Gillespie, Louis J. Expansion of gases on mixing, especially at very low pressures. I. Its relation to empirical calculation of fugacities in gaseous mixtures—352
—— Empirical calculation of fugacities in gaseous mixtures. II. Its relation to tangents on certain thermodynamic diagrams. Approximate equations for some important thermodynamic properties of gas mixture—1605
Goetz, A., R. C. Hergenrother and **A. B. Focke.** Effect of strong magnetic fields on formation of bismuth single-crystals—546(A)
——— and **M. Hassler.** Electric volume-effects in bismuth single-crystals grown in strong magnetic fields—549(A)
Goudsmit, S. (see Uhlenbeck, G. E.)—145
——— and **R. F. Bacher.** Separations in hyperfine structure—1501
——— and **R. F. Bacher.** Paschen-Back effect of hyperfine structure—1499(L)
Goyer, Marie. (see Duffendack, O. S.)—1132
Granath, L. P. (see Dawson, L. H.)—136
——— and **E. O. Hulburt.** Absorption of light by fog—140
——— Absorption of ultra-violet light by oxygen, water vapor and quartz—1045
Guillemin, Victor Jr. (see Zener, Clarence) —999
Gunn, Ross. Theory of permanent magnetic fields of sun and earth—335; A correction —1621

Hanawalt, J. D. (see Ingersoll, L. R.)—972
Harnwell, Gaylord P. Electron scattering in hydrogen—162(L)
——— Electron scattering in atomic and molecular hydrogen—661
Harrison, George R. Intensities in supermultiplets of titanium—540(A)
——— An electric vacuum furnace for quantitative line intensity determinations —545(A)

——— (see Hesthal, Cedric E.)—543(A)
Harvey, A. and **F. A. Jenkins.** Alternating intensities in absorption bands of Li_2—1286(L)
Hassler, M. (see Goetz, A.)—549(A)
Heaps, C. W. and **Josiah Taylor.** Discontinuities of magnetization in iron and nickel—937
Hendricks, Sterling B. Electron diffraction by a copper crystal—1287(L)
——— (see Langer, R. M.)—544(A)
Henshaw, Clement L. (see Duffendack, O. S.)—1132
Hergenrother, R. C. (see Goetz, A.)—546(A)
Herzfeld, K. F. Influence of surface conditions and space charges on conductivity of poor conductors—791
Hesthal, Cedric E. and **George R. Harrison.** A projection lantern microphotometer—543(A)
Hidnert, Peter. Thermal expansion of tantalum—544(A)
Hildebrand, Joel H. Intermolecular attractions in liquids—542(A)
——— Compressibilities and thermal pressure coefficients of certain liquids—649
——— Intermolecular forces in liquids—984
Hill, E. L. On Zeeman effect in doublet band spectra—1507
Hollaender, Alexander and **John Warren Williams.** Molecular scattering of light from solids: Plate glass—380(L)
——— and **John Warren Williams.** Molecular scattering of light from solids: crystalline sulfates and their water solutions—994
Houston, William V. Temperature dependence of electrical conductivity—279
——— Temperature dependence of electrical resistance—547(A)
Howey, J. H. Magnetic behavior of nickel and iron films condensed in vacuum upon various metal backings—1440
Hughes, A. Ll. and **V. Rojansky.** On analysis of electronic velocities by electrostatic means—284
——— and **J. H. McMillen.** Re-focussing of electron paths in a radial electrostatic field—291
Hulburt, E. O. (see Dawson, L. H.)—136
——— (see Granath, L. P.)—140
——— Wind mixing and diffusion in upper atmosphere—161(L)
——— On ultra-violet light theory of aurorae and magnetic storms—344
——— Temperature of planets—1063(L)
——— Ions and electrical currents in upper atmosphere of earth—1167
Hyatt, J. M. Distribution of electrons between plate and grid of a three electrode tube as determined by positive caesium ions—486

Ingersoll, L. R. and **J. D. Hanawalt.** Gas content, crystal structure and hydrogen absorption of sputtered nickel films—972
Ingram, S. B. Classification of arc spectra of nitrogen and carbon—421
Ives, Herbert E. and **A. R. Olpin.** Maximum excursion of photoelectric long wave limit of alkali metals—117

Jauncey, G. E. M. and **H. Bauer.** Temperature and Compton effect—387
Jenkins, F. A. (see Harvey, A.)—1286(L)
Jenness, J. R. Effect of temperature upon fluorescence of some organic solutions—1275
Johnson, Arthur J. M. *M*-series absorption spectra of metallic platinum and gold—1106
Johnstone, J. H. L. and **John Warren Williams.** Variation of dielectric constant with frequency—1483
Jones, Roderick Bissell. Photoelectric threshold of a doubly evaporated film—227

Kaplan, Joseph. (see Dawson, L. H.)—379(L)
——— Excitation of β bands of nitric oxide—165(L)
——— Electron scattering in hydrogen—1227(L)
——— Raman lines in spectrum of electric discharge—1393(L)
——— (see Kinsey, E. L.)—545(A), 546(A)
Kassel, Louis S. Heat of dissociation of oxygen—817(L)
King, Arthur S. and **Raymond T. Birge.** An isotope of carbon, mass 13—376(L)
——— Characteristics of electric furnace spectra of europium, gadolinium, terbium dysprosium and holmium, λ3900–λ4700—540(A)
——— Features of furnace, arc and spark spectra of hafnium—544(A)
Kingdon, K. H. (see Langmuir, Irving)—129
Kinsey, E. L. Raman effect in water—541(A)

Kinsey, E. L. and **Joseph Kaplan.** Recombination of atoms—545(A)
——— and **Joseph Kaplan.** Transition probabilities—546(A)
Kirkpatrick, Paul and **Margaret Dewar.** Classical scattering in x-ray reflection 549(A)
Knudsen, V. O. Speech-power of speakers in auditoriums—549(A)
Korff, S. A. Dispersion and absorption line width in alkali vapors—457
Kovarik, Alois F. Book review—166
Kruger, Gerald. Extension of spark spectrum of copper—1122
Kurt, O. E. and **T. E. Phipps.** Magnetic moment of oxygen atom—1357

Laird, Harold R. Effect of hydrogen on thermionic emission from potassium—463
Lang, R. J. Spark spectra of germanium—697
——— (see Sawyer, R. A.)—712
Langer, R. M. Quantum mechanics of chemical reaction—92
——— and **S. B. Hendricks.** Multiple processes in x-ray region—544(A)
Langmuir, Irving and **K. H. Kingdon.** Contact potential measurements with adsorbed films—129
——— (see Tonks, Lewi)—876
Lansing, William D. New terms in spectra of Al I, Ga I, and In I—597
Laporte, O. and **L. A. Young.** Regularities in ionization potentials of light elements —1225(L)
Lawrence, Ernest O. and **N. E. Edlefsen.** Photo-ionization of vapors of caesium and rubidium—233
——— and **Frank G. Dunnington.** Early stages of electric spark discharges—1624(L)
——— and **N. E. Edlefsen.** Photo-ionization of potassium vapor—1056
——— and **Leon B. Linford.** Effect of intense electric fields on photoelectric behavior of alkali films on tungsten—1492(L)
Levin, Aaron. (see Meyer, Charles F.)—44
Lewis, Evan Jarrett. Some thermal and electrical properties of beryllium—1575
Lindsay, R. B. Note on theory of acoustic wave filters—652
——— Connectors in acoustical conduits—808
——— Book review—383
Linford, Leon B. (see Lawrence, Ernest O.) —1492(L)
Livingood, J. J. Arc spectrum of platinum —185
Loeb, Leonard B. and **Lauriston C. Marshall.** Theory of recombination of gaseous ions —542(A)
——— Note concerning emission of beta-rays in radioactive change—1212

Mack, J. E. Vector coupling in nickel-, palladium- and platinum-like spectra—17
Mackeown, S. S. Cathode drop in electric arc—611
Marshall, Lauriston C. Recombination of ions and of ions and electrons in gases—541(A), 618
——— (see Loeb, Leonard B.)—542(A)
Matuyama, E. (see Okubo, J.)—1474
Maxwell, Louis R. Mean life for mercury spark spectrum—199
McAlister, E. D. and **H. J. Yearian.** New method of measuring thermal conductivities of gases—542(A)
——— Spectrum of neutral mercury atom in wave-length range from 1 to 2μ—1142
McKeehan, L. W. Book Reviews—384, 660
McMillen, J. H. (see Hughes, A. Ll.)—291
McRae, Daniel B. (see Tolman, Richard C.) —1075
Mendenhall, C. E. Determination of Stefan-Boltzmann constant of radiation—502
Merritt, Ernest. Book Review—384
Messenger, Helen A. (see Webb, Harold W.) —1463
Meyer, Charles F. and **Aaron A. Levin.** On absorption spectrum of hydrogen chloride —44
Miles, John B., Jr. Dielectric constant and electric moment of some alcohol vapors —964
Miley, H. A. (see Pietenpol, W. B.)—1588
Monk, George S. (see Mulliken, Robert S.) —1530
Morse, Philip M. Diatomic molecules according to wave mechanics. II. Vibrational levels—57
Mouzon, J. C. (see Sutton, Richard M.) —547(A)
Mulliken, Robert S. and **George S. Monk.** Fine structure and Zeeman effects in helium band lines—1530
Myers, Frank E. and **R. T. Cox.** Transmission of β-rays through magnetized iron foil: attempt to polarize a beam of electrons —1067

Nash, W. G. (see Black, J. G.)—1138

Naudé, S. M. An isotope of nitrogen, mass 15—1498(L)
Neuman, L. J. Mechanism of spark discharge —550(A)
Newbury, Kirsten. Effect of light on electron emission from oxide-coated filaments—1418
Niessen, K. F. On saturation of electric and magnetic polarization of gases in quantum mechanics—253
Okubo, J. and **E. Matuyama.** On wave form of a sound produced by a spark—1474
Olpin, A. R. (see Ives, Herbert E.)—117
——— Apparent modulation of light by films of dielectrics on cathodes of alkali metal photoelectric cells—544(A)
Olson, H. F. (see Ellett, A.)—493
Ornstein, L. S. and **J. Rekveld.** Intensity measurements in Raman effect and distribution law of Maxwell-Boltzmann—720
Osgood, Thomas H. Ranges of ionizing electrons in helium—1234
Ostensen, Floyd C. A new method for study of voltage-intensity relations and its application to mercury 2537A line—1352
Owen, G. E. Dielectric losses at high frequencies—1035
Page, Leigh. Conductivity of ions in crossed electric and magnetic fields—763
Parlin, W. A. Effect of temperature on absorption bands of fused quartz in infrared—81
Pauling, Linus. Photo-ionization in liquids and crystals and dependence of frequency of x-ray absorption edges on chemical constitution—954
——— (see Podolsky, Boris)—109
Pearson, Gerald L. Relative probabilities of ionization of K and L-series electrons of equal ionization energy—542(A)
Phipps, T. E. (see Kurt, O. E.)—1357
Pielemeier, W. H. Pierce acoustic interferometer as an instrument for determination of velocity and absorption—1184
Pietenpol, W. B. and **H. A. Miley.** Electrical resistivities and temperature coefficients of lead, tin, zinc and bismuth in solid and liquid states—1588
Plyler, E. K. and **P. J. Steele.** Infra-red absorption spectra of organic nitrates—599
Podolsky, Boris and **Linus Pauling.** Momentum distribution in hydrogen-like atoms —109
——— and **Vladimir Rojansky.** On theory of Smekal-Raman effect in hydrogen-like atoms—1367
Poole, C. A. (see Black, J. G.)—1138
Purks, Harris. (see Davis, Bergen)—1, 181

Race, Hubert H. and **James R. Campbell, Jr.** Dielectric polarization potential and law of superposition for hard rubber—1031
Rasetti, F. Incoherent scattered radiation in diatomic molecules—367
——— Incoherent scattering and structure of diatomic molecules—548(A)
——— (see Dickinson, R. G.)—582
Redeker, H. E. (see Stowell, E. Z.)—978
Reich, Herbert J. New type of glow discharge tube—997(L)
Rekveld, J. (see Ornstein, L. S.)—720
Rice, Oscar Knefler. Temperature coefficient of radioactive disintegration—550(A)
——— On quantum mechanics of chemical reactions: predissociation and unimolecular decompositions—1451
Richtmyer, F. K. and **R. D. Richtmyer.** Satellites of x-ray lines $L\alpha$, $L\beta_1$, and $L\beta_2$ —574
Richtmyer, R. D. (see Richtmyer, F. K.) —574
Robertson, H. P. Uncertainty principle —163(L)
Rojansky, V. (see Hughes, A. Ll.)—284
——— (see Podolsky, Boris)—1367
Rollefson, A. H. Infra-red absorption spectrum of hydrogen sulphide—604
Rollefson, G. K. (see Christensen, Carl J.) —1154, 1157
Russell, Henry Norris. Book review—385
——— Arc spectrum of nickel—821
——— Letter to Editor—1394(L)

Samson, E. W. (see Turner, Louis A.) —743, 747
Sawyer, R. A. and **R. J. Lang.** Spectrum of gallium II and ($4s4p^2$) configuration in gallium I and indium I—712
Sawyer, R. B. Reflection of lithium ions from metal surfaces—1288(L)
Schulwas-Sorokina, R. D. Is it possible to determine piezoelectric constant at high temperatures by statical method?—1448
Sears, R. W. (see Smith, Alpheus W.)—1466
Shenstone, A. G. Secondary diffraction maxima of spectral lines—726
——— An unusual spectral series—1623(L)
Slater, J. C. Theory of complex spectra—1293
Smith, Alpheus W. and **R. W. Sears.** Hall effect in permalloy—1466
Smith, H. L. (see Duffendack, O. S.)—68

Smith, K. O. (see Carman, A. P.)—1040, 1042
Smith, L. P. Positive ion emission from tungsten and molybdenum—1496(L)
Smith, Stanley. Second spark spectrum of lead, Pb III—393
Smith, W. O., Paul D. Foote and **P. F. Busang.** Packing of homogeneous spheres—1271
Smyth, Charles P. Book review—166
Spedding, Frank H. (see Freed, Simon)—945
Spence, B. J. and **M. A. Easley.** Near infrared absorption spectra of some halogen derivatives of ethane—730
Stauss, H. E. Reflections of x-rays from platinum films sputtered on glass—1021
——— Errors in use of gratings with x-rays due to divergence of radiation—1601
Steele, P. J. (see Plyler, E. K.)—599
Stewart, John Q. Definition of frequency—1052
——— Indetermination principles involving k and e—1289(L)
Stockbarger, Donald C. and **Laurence Burns.** On methods of filter radiometry—1263
Stone, S. Bradford. Kinetic correction in fluid flow—1391(L)
Stowell, E. Z. and **H. E. Redeker.** Role of hydrogen in oscillating arc—978
Stueckelberg, E. G. C. Simultaneous ionization and dissociation of oxygen and intensities of ultra-violet O_2^+ bands—65
Sugiura, Y. On transition probability between two states with positive energy in a central field—858
Sutton, Richard M. and **J. C. Mouzon.** Ionization of nitrogen and air by positive ion bombardment—547(A)

Tate, John T. Book reviews—382, 660, 998, 1065.
Taylor, Josiah. (see Heaps, C. W.)—937
Tolman, Richard C. and **Daniel B. McRae.** Experimental demonstration of equivalence of a mechanically oscillated electrostatic charge to an alternating current—1075
Tonks, Lewi and **Irving Langmuir.** General theory of plasma of an arc—876
Turner, Louis A. and **E. W. Samson.** Dissociation of nitrogen by electron impact—743
——— and **E. W. Samson.** Excitation potential of negative bands of nitrogen—747
Uhlenbeck, G. E. and **S. Goudsmit.** A problem in Brownian motion—145
Urey, H. C. and **John R. Bates.** Continuous spectra of flames containing halogens—1541
Utterback, C. L. Total radiation from nickel and cobalt—785

Valasek, J. Book review—1065, 1628
——— Precision measurements in K-series of elements 48 Cd and 49 In—1231
Van den Akker, J. A. (see Watson, E. C.)—547(A)
Van Vleck, J. H. Book review—1230
——— and **A. Frank.** Effect of second order Zeeman terms on magnetic susceptibilities in rare earth and iron groups—1494(L); correction—1625(L)
Vieweg, Alice M. (see Gibbs, R. C.)—400, 406
Villars, Donald Statler. Chemical heats of activation—1063(L)

Wahlin, H. B. Emission of positive ions from metals—164(L)
Wang, S. C. On the asymmetrical top in quantum mechanics—243
Watson, E. C. and **J. A. Van den Akker.** Differences in directions of ejection of x-ray photoelectrons from various atomic levels—547(A)
Watson, William W. Heat of dissociation at diatomic hydride molecules—372
——— Rotational instability and uncoupling of electronic orbital angular momentum from axis in diatomic molecules—1010
Webb, Harold W. and **Helen A. Messenger.** Short duration phosphorescence in fused quartz—1463
Welo, L. A. On absence of change in magnetic susceptibility with crystallization in strong magnetic fields—296
White, H. E. Interpretation of hyperfine structure in spectral lines—1288(L), 1404
——— Hyperfine structure in single ionized praseodymium—1397
Whitelaw, Neill G. Raman effect of ketones—376(L)
Whitney, John D. Inelastic collisions in mercury vapor—923
Williams, John Warren. (see Hollaender, Alexander)—380(L), 994.
——— (see Johnstone, J. H. L.)—1483
Williamson, R. C. Book review—1291
Wilson, H. A. Book review—382
——— On value of electronic charge—1493(L)
Winger, Ralph. Valence of sulfur in dithionates—548(A)
——— Relation between lattice energy and shift in x-ray absorption edges—549(A)

Wolfe, R. A. (see Duffendack, O. S.)—409

Yearian, H. J. (see McAlister, E. D.)—542(A)
Young, L. A. (see Laporte, O.)—1225(L)
——— Binding energy of light atoms—1226(L)
Young, O. B. (see Carman, A. P.)—1040

Zahl, H. A. (see Ellett, A.)—493
Zemansky, M. W. Radii and collision probabilities of metastable neon and mercury atoms—213
Zeleny, John. Distribution of mobilities of ions in moist air—310
Zener, Clarence and **Victor Guillemin, Jr.** *B*-state of hydrogen molecule—999
Zwicky, F. On the possibility of a gravitational drag of light—1623(L)

ANALYTIC SUBJECT INDEX TO VOLUME 34

References with (A) are to abstracts of papers presented at meetings of Physical Society. References with (L) are to Letters to Editor.

Absorption of light (see also Spectra)

Alkali vapors, dispersion and line width, S. A. Korff—457
Benzene and halogen derivatives, infra-red, J. Daugherty—1549
Crystals at low temperatures, line absorption, S. Freed, F. H. Spedding—945
Fused quartz, infra-red bands, effect of temperature, W. A. Parlin—81
Fog, L. P. Granath, E. O. Hulburt—140
Lower atmosphere, ultra-violet, L. H. Dawson, L. P. Granath, E. O. Hulburt—136
Organic nitrates, infra-red, E. K. Plyler, P. J. Steele—599
Oxygen, water vapor and quartz in ultra-violet, L. P. Granth—1045

Acoustics

Connectors in acoustical conduits, R. B. Lindsay—808
Pierce interferometer for measuring velocity and absorption of sound, W. H. Pielemeier—1184
Propagation in gas mixtures, theory, D. G. Bourgin—521
Speech power of speakers in auditoriums, V. O. Knudsen—549(A)
Wave-filters, theory, R. B. Lindsay—652
Wave form of sound produced by spark, J. Okubo, E. Matuyama—1474

Activation

Chemical heats, D. S. Villars—1063(L)

Adsorption

Air and water vapor on rock salt, J. H. Frazer—644
Air on glass, temperature variation, A. S. Adams—1438
Gas on sputtered Ni films, L. R. Ingersoll, J. D. Hanawalt—972

Alpha-particles

Recombination with electrons, probability, B. Davis, A. H. Barnes—152; theory, E. Q. Adams—537(L); discussion, A. H. Barnes—1229(L)

Arc (see also Discharge of electricity in gases, Electrons in gases)

Cathode drop, theory, S. S. Mackeown—611
Oscillating arc, role of hydrogen, E. Z. Stowell, H. E. Redeker—978
Sodium arc, high intensity, Carl J. Christensen, G. K. Rollefson—1154
Theory of plasma, L. Tonks, I. Langmuir—876

Astrophysics

Gravitational drag of light, F. Zwicky—1623(L)
Partial pressure of oxygen in sun, A. Christy—539(A)
Temperature of planets, E. O. Hulburt—1063(L)

Atomic beams

Of protons, reflection from crystals, A. J. Dempster—1493(L)
Reflection from crystals, A. Ellett, H. F. Olson, H. A. Zahl—493

Atomic structure (see also Mechanics, quantum, Spectra, X-rays)

Occupation of electron levels, from x-ray spectra, S. K. Allison—7
Momentum distribution in hydrogenic atoms, B. Podolsky, L. Pauling—109
Radii and collision probabilities of metastable Ne and Hg, M. W. Zemansky—213

Atmospheric electricity (see also Geophysics)

Ions and electric currents in upper atmosphere, E. O. Hulburt—1167

Aurora

Ultra-violet light theory of origin, E. O. Hulburt—344

Barkhausen effect (see also Magnetic properties)

Fe and Ni, C. W. Heaps, J. Taylor—937
Iron, nickel and permalloy, R. M. Bozorth—772

Beta-rays

Emission energies, discussion, L. B. Loeb—1212
Transmission through magnetized Fe foil, F. E. Myers, R. T. Cox—1067

Book reviews

Audubert, R., Ch. de Massacre, A. Buffat, L.

Durand, and G. Foex, Donneés Numériques d'Electricité Magnetisme et Electrochimie—382
Barus, Carl, Acoustic Experiments with the Pin-Hole Probe and the Interferometer U-Gauge—383
Birtwistle, George, The Principles of Thermodynamics—1230
Bragg, Sir William H., An Introduction to Crystal Analysis—384
Campbell, J. W., Numerical Tables of Hyperbolic and Other Functions—1065
Clark, W., T. Slater Price, B. V. Storr, Proceedings of the Seventh International Congress of Photography—1628
Debye, P., Polar Molecules—1230
Eberhard, G., A. Kohlschutter, and H. Ludendorff, Handbuch der Astrophysik. Bd. IV—385
Errera, J., Polarisation Dielectrique—166
Eucken, A., Energie und Wärmeinhalt—998
Fitch, A. L., Fundamentals of Physics—1291
Fletcher, Harvey, Speech and Hearing—1396
Frenkel, J., Einführung in die Wellenmechanik—1065
Gmelin's Handbuch der Anorganischen Chemie, System-Nummer 21: Natrium, System-Nummer 31: Radium und Isotope, System-Nummer 59: Eisen—660
Guertler, W. and W. Leitgebel, Vom Erz zum Metallischen Werkstoff—383
Günther-Schulze, A., Elektrische Gleichrichter und Ventile—820
Kilby, C. M., Introduction to College Physics—1291
Manfred von Ardenne, Verstärkermesstechnik—1291
McDonald, Philip B., English and Science—660
Milne-Thomson, L. M., Standard Table of Square Roots—998
Pacotte, Julien, Les Methodes Nouvelles en Analyse Quantique—1230
Pettersson, Hans, Künstliche Verwandlung der Elemente—166
Rawlins, F. I. G. and A. M. Taylor, Infra-Red Analysis of Molecular Structure—1395
Rinne, Friedrich, Zur Nomenklatur der 32 Kristallklassen. Über eine neue Herleitung und Nomenklatur der 230 Kristallographischen Raumgruppen. Ernst Schiebold—384
Schottky, W., H. Ulich and C. Wagner, Thermodynamik. Die Lehre von den Kreisprozessen, den physikalischen und chemischen Veränderungen und Gleichgewichten. Eine Einführung zu den thermodynamischen Problemen unserer Kraft- und Stoffwirtschaft—819
Sheldon, H. Horton and E. N. Grisewood, Television—1396
Wagner, Albert F., Experimental Optics—1065
Wien und Harms, Handbuch der Experimentalphysik. Bd. 13, Teil I. Die Ionenleitung in Gasen, Shweidler. Teil II. Die Elektrischen Eigenschaften der Flamme, Becher—382
Wien und Harms, Handbuch der Experimentalphysik. Bd. 18. K. F. Bottlinger, R. Ladenburg, M. v. Laue, Hans Schulz, and E. Warburg—1628
Wien und Harms, Handbook der Experimentalphysik. Bd. 23, Phosphoreszenz. P. Lenard, F. Schmidt and R. Tomaschek—384

Brownian motion
Rotatorial, of small mirror, theory, G. E. Uhlenbeck, S. Goudsmit—145

Chemical reaction
Quantum mechanics of, R. M. Langer—92; O. K. Rice—1451

Compressibility
Liquids, J. H. Hildebrand—649

Compton effect
Fine structure, B. Davis, H. Purks—1
Relation to temperature, G. E. M. Jauncey, H. Bauer—387

Conductivity, electrical (see Electrical conductivity)
Conductivity, thermal (see Thermal conductivity)

Contact potential
Measurements with absorbed films on tungsten, I. Langmuir, K. H. Kingdon—129

Cosmic radiation
Nature, L. F. Curtiss—1391(L)

Crystals and crystal structure
Bi, effect of magnetic force on formation, A. Goetz, R. C. Hergenrother, A. B. Focke—546(A)
Bi, grown in magnetic fields, electric volume effects, A. Goetz, M. Hassler—549(A)
Energy changes by variation from crystallographic group, H. M. Evjen—1385
Lattice energy and shift in x-ray absorption energies, R. Winger—549(A)
Sputtered Ni films, L. R. Ingersoll, J. D. Hanawalt—972

Dielectric properties
Alcohol vapors, J. B. Miles, Jr.—964
Argon, neon, constants, A. B. Bryan—615
CH_3 and Br radicals, electric moments, C. R. Daily—548(A)
Conducting liquids, method of measuring, A. Astin—300
Electrolytes, dielectric constants, measurements, A. P. Carman, K. O. Smith—1042

Electrolytes, dielectric constants, method, A. P. Carman, O. B. Young, K. O. Smith—1040
Hard rubber, polarization potential and law of superposition, H. Race, J. R. Campbell, Jr.—1031
Power losses at high frequencies, G. E. Owen—1035
Saturation of electric polarization in gases, K. F. Niessen—253
Variation with frequency, J. H. L. Johnstone, J. W. Williams—1483

Diffraction of light (see also X-rays)
In spectra, secondary maxima, A. G. Shenstone—726

Diffraction of matter (see also Electron diffraction)
Atomic beams, reflection from crystal, A. Ellett, H. F. Olson, H. A. Zahl—493
Proton beams, reflection from crystal, A. J. Dempster—1493(L)

Discharge of electricity in gases (see also Arcs, Electrons in gases, Spark discharge)
Electrodeless ring discharge, nature, C. J. Brasefield—1393(L), 1627(L)
New type of glow discharge tube, H. J. Reich—997(L)

Discharge of electricity in high vacua
Electron emission in high fields, theory, P. W. Bridgman—1411

Disintegration of nucleus
By artificial means, possibility, G. Breit—817(L)

Dispersion of light
In alkali vapors, absorption line width, S. A. Korff—457

Electric moment
Alcohol vapors, J. B. Miles, Jr.—964
CH_3 and Br radicals, C. R. Daily—548(A)

Dissociation
Nitrogen by electron impact, L. A. Turner, E. W. Samson—743
O_2, by electron impact, theory, E. C. G. Stueckelberg—65

Dissociation, heat of
O_2 and N_2, from spectra, R. T. Birge—1062(L)
O_2, calculation, L. S. Kassel—817(L)
Of diatomic hydride molecules, from spectra, W. W. Watson—372

Elasticity
Conically wound spring, extension and period, O. B. Ader—656

Electrical conductivity
Bi crystals grown in magnetic field, A. Goetz, M. Hassler—549(A)
Metals, temperature dependence, theory, W. V. Houston—279, 547(A)
Ions in crossed electric and magnetic fields, L. Page—763
Pb, Sn, Zn, Bi, solid and liquid, temperature coefficients, W. B. Pietenpol, H. A. Miley—1588
Poor conductors, influence of surface conditions and space charges, K. F. Herzfeld—791
Thin K layer, effect of hydrogen, H. R. Laird—463

Electrical properties
Be, E. J. Lewis—1575

Electromagnetic theory
Effect of retardation on interaction of two electrons, G. Breit—553
Equivalence of an oscillating charge to an alternating current, R. C. Tolman, D. B. McRae—1075

Electron, charge
Value of e, discussion, H. A. Wilson—1493 (L)

Electron, diffraction
By Cu crystal, H. E. Farnsworth—679; discussion, S. B. Hendricks—1287(L)

Electrons (see also Thermionic emission)
Attempt to polarize beam by transmission through magnetized Fe foil, F. E. Myers, R. T. Cox—1067
Emission by metastable atoms, C. G. Found—1625(L)
Interaction of two electrons, theory, G. Breit—375(L)
Motion in electrostatic fields, analysis of velocity, A. Ll. Hughes, V. Rojansky—284; refocussing of electron paths, A. Ll. Hughes, J. H. McMillen—291
Polarization of beam, test for, C. T. Chase—1069

Electrons in gases
Alkali metal vapors, absorption, R. B. Brode—673
Atomic and molecular hydrogen, G. P. Harnwell—661
Dissociation of nitrogen, L. A. Turner, E. W. Samson—743
Hg, efficiency of excitation of λ2537, F. C. Ostensen—1352
Hg vapor, inelastic collisions, probabilities, W. H. Brattain—474; John D. Whitney—923
In He, ranges, T. H. Osgood—1234
Theory of arc plasma, L. Tonks, I. Langmuir—876

Electrons in metals (see also Electrical conductivity)
Emission under high fields, theory, P. W. Bridgman—1411

Electron scattering
In hydrogen, angular distribution, G. P. Harnwell—162(L); discussion, J. Kaplan—1227(L)
Hg vapor, anomalous, W. H. Brattain—474
Test for polarization, C. T. Chase—1069

Electrons, secondary
From Cu crystal, H. E. Farnsworth—679

From grid under Cs^+ ion bombardment, J. M. Hyatt—486

Energy states (see also Spectra)
Of light atoms, binding energy, L. A. Young—1226(L)

Errata
To propagation of Schroedinger waves in uniform field, G. Breit—1491
To perterbations in molecules and theory of predissociation and diffuse spectra, O. K. Rice—1462
To effect of second order terms on magnetic susceptibilities, J. H. Van Vleck, A. Frank—1625(L)

Excitation of atoms and molecules
Diatomic molecules by positive ions and excited atoms, O. S. Duffendack, H. L. Smith—68
Excitation of Mg II spectrum by impacts of second kind, O. S. Duffendack, Clement L. Henshaw, Marie Goyer—1132
Hg, radius, E. Gaviola—1049

Field currents
Theory, P. W. Bridgman—1411

Flames
Containing halogens, continuous spectra, H. C. Urey, J. R. Bates—1541

Fluorescence
Na vapor, transition probabilities, C. J. Christensen, G. K. Rollefson—1157
Organic solutions, effect of temperature, J. R. Jenness—1275
Quenching collisions in Hg vapor, efficiency, E. Gaviola—1049
Resonance-fluorescence in CN spectrum, H. T. Byck—453

Frequency
Definition of, J. Q. Stewart—1052

Frequency analyzer
Electro-mechanical, L. P. Delsasso—550(A)

Fugacities
In gaseous mixtures, calculation, L. J. Gillespie—1605

Furnace spectra (see Spectra)

Galvanomagnetic effects
Hall effect in permalloy, A. W. Smith, R. W. Sears—1466

Gamma rays
Status of gamma-ray change, N. Feather—1558

Geissler discharge (see Discharge of electricity through gases)

Geophysics
Ions and electric currents in upper atmosphere, E. O. Hulburt—1167
Magnetic field of sun and earth, theory, R. Gunn—335; correction—1621
Ultra-violet light theory of aurorae magnetic and storms, E. O. Hulburt—344

Hall effect
In permalloy, A. W. Smith, R. W. Sears—1466

Heat conductivity (see Thermal conductivity)

Hydrodynamics
Fluid flow, kinetic correction. S. B. Stone—1392(L)

Indetermination principles
Involving k and e, J. Q. Stewart—1289(L)

Intensities in spectra
Forbidden nebular lines, theory, J. H. Bartlett, Jr.—1247
HCl, harmonic band, J. L. Dunham—438
Hg, λ2537, voltage-intensity, F. C. Ostensen—1352
Hydrogen, as function of electron velocity, C. J. Brasefield—431
Li_2 absorption bands, alternating intensities, A. Harvey, F. A. Jenkins—1286(L)
Mg 4571 and 2852, effect of foreign gases, J. G. Frayne—546(A), 590
Ti I, intensities in super-multiplets, G. R. Harrison—540(A)
Ti II, in generalized multiplet, H. Engwicht—541(A)
Vacuum furnace for measurement, G. R. Harrison—545(A)

Ionization
Diatomic molecules by positive ions and excited atoms, O. S. Duffendack, H. L. Smith—68
Hg vapor, ionization potentials for Hg^+, Hg^{2+}, Hg^{3+}, Hg^{4+}, Walker Bleakney—157
K and L-series electrons, relative probabilities, G. L. Pearson—542(A)
N_2 and air by positive ions, R. M. Sutton, J. C. Mouzon—547(A)
O_2, by electron impact, theory, E. C. G. Stueckelberg—65

Ionization by radiation (see Photo-ionization)

Ions
Emission from metals, H. B. Wahlin—164(L)
Emission from W and Mo, L. P. Smith—1496(L)
Li^+, reflection from metals, R. B. Sawyer—1288(L)
Motion in crossed electric and magnetic fields, L. Page—763
Recombination in gases, L. C. Marshall—541(A), 618; theory, L. B. Loeb, L. C. Marshall—542(A)
Reflection of H^+ from crystals, A. J. Dempster—1493(L)
Scattering of Li^+ in Hg vapor, I. W. Cox—1426

Ions, mobility
In moist air, J. Zeleny—310
Nature of ions in air, H. A. Erikson—635
Isotopes
Ag and Cl, from AgCl spectrum, B. A. Brice—1227(L)
Carbon, from band spectra, A. S. King, R. T. Birge—376(L); further evidence—379(L)
Nitrogen, S. M. Naudé—1498(L)
Oxygen, relative abundance, from spectra, H. D. Babcock—540(A)

Joule-Thomson effect
For air, O. C. Bridgeman—527

Liquids
Intermolecular forces, J. H. Hildebrand—984

Magnetic fields
Of sun and earth, theory, R. Gunn—335; correction—1621

Magnetic properties
Bi, effect on single crystal formation, A. Goetz, R. C. Hergenrother, A. B. Focke—546(A)
Fe and Ni, Barkhausen effect, C. W. Heaps, J. Taylor—937
Iron, nickel and permalloy, Barkhausen effect, R. M. Bozorth—772
Isolated ferromagnetic atoms, F. W. Constant—548(A), 1217
Ni and Fe films, J. H. Howey—1440
Oxygen, magnetic moment, O. E. Kurt, T. E. Phipps—1357
Permalloy, Hall effect, A. W. Smith, R. W. Sears—1466
Saturation of magnetic polarization of gases, quantum theory, K. F. Niessen—253
Susceptibilities of crystals, absence of change with crystallization in strong fields, L. A. Welo—296
Susceptibilites of rare earth and iron group, effect of second order Zeeman terms, J. H. Van Vleck, A. Frank—1494(L); errata—1625(L)

Magnetic storms
Ultra-violet light theory of origin, E. O. Hulburt 344

Mechanics, quantum
Asymmetrical top, S. C. Wang—243
B state of H_2, C. Zener, V. Guillemin, Jr.—999
Chemical reaction, R. M. Langer—92
Chemical reaction, O. K. Rice—1451
Complex spectra, J. C. Slater—1293
Continuous x-rays, C. Eckart—167
Diatomic molecules, vibrational levels, P. M. Morse—57
Hyperfine structure, H. E. White—1404; 1288(L)
Intensities of forbidden nebular lines, J. H. Bartlett, Jr.—1247
Interaction of two electrons, G. Breit—553(L)
Magnetic susceptibility, effect of second order Zeeman terms, J. H. Van Vleck, A. Frank—1494(L); errata—1625(L)
Metallic conductivity at low temperatures, W. V. Houston—279
Momentum distribution in hydrogenic atoms, B. Podolsky, L. Pauling—109.
Perturbation in molecules and theory of predissociation and diffuse spectra, a correction, O. K. Rice—1462
Propagation of Schroedinger waves in uniform field, a correction, G. Breit—1491
Saturation of electric and magnetic polarization of gases, K. F. Niessen—253
Smekal-Raman effect in hydrogenic atoms, B. Podolsky, V. Rojansky—1367
Transition probabilities, E. L. Kinsey, J. Kaplan—546(A); Y. Sugiura—858
Uncertainty principle, H. P. Robertson—163(L)

Mechanics, statistical
Generalized form of new statistics, S. Chandrasekhar—1204

Metastable atoms
Electron emission by, C.G. Found—1625(L)
Life and concentration, E. Gaviola—1373
Ne and Hg, radii and collision probabilities, M. W. Zemansky—213
Of rare gases, excitation of Mg II spectrum by collision, O. S. Duffendack, C. L. Henshaw, M. Goyer—1132

Meteorology
Wind mixing and diffusion in upper atmosphere, E. O. Hulburt—161(L)

Methods and instruments
Electro-mechanical frequency analyzer, L. P. Delsasso—550(A)
Electrostatic analyzer of electron velocities, A. Ll. Hughes, V. Rojansky—284, 291
For determining hysteresis loops in small specimens, C. W. Heaps, J. Taylor—937
For filter radiometry, D. C. Stockbarger, L. Burns—1263
For measuring dielectric constants of conducting liquids, A. Astin—300
For measuring dielectric constants of electrolytes, A. P. Carman, O. B. Young, K. O. Smith—1040
For measuring power losses in dielectrics at high frequencies, G. E. Owen—1035
For measuring thermal conductivities of gases, E. D. McAlister, H. J. Yearian—542(A)
For positive ray analysis, W. Bleakney—157

Glow discharge tube, new type, H. J. Reich—997(L)
Photoelectric cell for erythema, F. W. Cook—1287(L)
Projection lantern microphotometer, C. E. Hesthal, G. R. Harrison—543(A)
Sodium arc of high intensity, C. J. Christensen, G. K. Rollefson—1154
Use of series inductance in vacuum spark spectra, R. C. Gibbs, A. M. Vieweg, C. W. Gartlein—406
Vacuum furnace for spectra, O. S. Duffendack, J. G. Black—35
Vacuum furnace for spectral intensity measurements, G. R. Harrison—545(A)
Vacuum tube calibration, J. M. Hyatt—486

Microphotometer
For projection lantern, C. E. Hesthal, G. R. Harrison—543(A)

Mobility of ions (see Ions, mobility)

Modulation of light
By dielectric films on alkali metals, A. R. Olpin—544(A)
By Kerr cell, A. Bramley—1061(L); comments, J. Cabannes—1497(L)

Molecular structure (see also Spectra, molecular)
Constants for Na_2, from spectrum, W. R. Fredrickson—207
Rotational instability and uncoupling of electronic orbital angular momentum from axis in diatomic molecules, W. W. Watson—1010

Motor, electric
Self-regulating, L. E. Dodd—545(A)

Nucleus
Disintegration by artificial means, possibility, G. Breit—817(L)
Regularities in existing types, H. A. Barton—1228(L)
Symmetry of nuclear wave functions, B. Cassen—1061(L)

Optics, geometrical
Field of view for two variable plane mirrors, L. E. Dodd—543(A)

Packing
Of homogeneous spheres, W. O. Smith, P. D. Foote, P. F. Busang—1271

Paschen-Back effect
In hyperfine structure, S. Goudsmit, R. F. Bacher—1499(L)

Periodic system
New graphical arrangement, A. E. Caswell—543(A)

Phosphorescence
Fused quartz, duration, H. W. Webb, H. A. Messenger—1463

Photoelectric cell
For use in erythema, F. W. Cook—1287(L)

Photoelectric effect
Alkali metal films, effect of intense electric fields, E. O. Lawrence, L. B. Linford—1492
Alkali metals, maximum long wave limit, H. E. Ives, A. R. Olpin—117
Cerium dioxide, effect on thermionic emission, C. E. Berger—1566
Gases, by x-rays, direction of ejection, C. D. Anderson—547(A); E. C. Watson, J. A. Van den Akker 547(A)
Modulation of light by dielectric films on alkali metals, A. R. Olpin—544(A)
Oxide-coated filaments, influence on thermionic emission, K. Newbury—1418
Threshold for doubly evaporated films, R. B. Jones—227

Photo-ionization
Cs and Rb vapor, E. O. Lawrence, N. E. Edlefsen—233
Liquids and crystals, theory, L. Pauling—954
K vapor, E. O. Lawrence, N. E. Edlefsen—1056

Piezo-electric effect
Determination of constant, R. D. Schulwas-Sorokina—1448

Planets
Temperature, E. O. Hulburt—1063(L)

Positive ions (see Ions)

Positive ray analysis
Of ions produced in Hg vapor, W. Bleakney—157
Search for element 87, K. T. Bainbridge—752

Potentials, critical
For excitation of negative bands in nitrogen, L. A. Turner, E. W. Samson—747
Hg, efficiency of excitation of 6.7, W. H. Brattain 474
Ionization potentials of Hg^+, Hg^{2+}, Hg^{3+}, Hg^{4+}, W. Bleakney—157
Ionization of Cu II, G. Kruger—1122
Ionization of Ga II, spectroscopic, R. A. Sawyer, R. J. Lang—712
Ionization of Ni I, H. N. Russell—821
Ionization potentials of light elements, regularities, O. Laporte, L. A. Young—1225(L)

Proceedings
American Physical Society, Berkeley meeting, June 21 and 22, 1929—538

Protons
Reflection from crystals, A. J. Dempster—1493(L)

Quantum theory (see Mechanics, quantum)

Raman effect
Crystalline sulfates and water solutions, A. Hollaender, J. W. Williams—994
Diatomic molecules, F. Rasetti—367, 548(A)

Frequency distribution, D. H. Andrews—1626(L)
Ketones, N. G. Whitelaw—376(L)
Plate glass, A. Hollaender, J. W. Williams—380(L)
Polyatomic gases, R. G. Dickinson, R. T. Dillon, F. Rasetti—582
Quantum mechanical theory, B. Podolsky, V. Rojansky—1367
Relation of intensity of lines to Maxwell-Boltzmann law, L. S. Ornstein, J. Rekveld—720
Spectra of electric discharges, J. Kaplan—1393(L)
Water, E. L. Kinsey—541(A)

Radiation, black body
Stefan-Boltzmann constant, determination, C. E. Mendenhall—502

Radiation, thermal
From Ni and Co, C. L. Utterback—785
From polished and soot-covered nickel, B. T. Barnes—1026

Radioactivity
Beta-ray emission, energies, discussion, L. B. Loeb—1212
Status of gamma-ray charge, N. Feather—1558
Temperature coefficient, O. K. Rice—550(A)

Radiometry
Methods of filter radiometry, D. C. Stockbarger, L. Burns—1263

Recombination
Alpha-particles and electrons, probability as function of relative velocity. B. Davis, A. H. Barnes—152; theory, E. Q. Adams—537(L); discussion, A. H. Barnes—1229(L)
Atoms, theory, E. L. Kinsey, J. Kaplan—545(A)
Ions and electrons in gases, L. C. Marshall—541(A), 618; theory, L. B. Loeb, L. C. Marshall—542(A)

Reflecting power
Calcite crystals for x-rays, B. Davis, H. Purks—181

Relativity
Coefficients of, S. R. Cook—549(A)

Resonance radiation
Excitation of spectra, O. S. Duffendack, J. G. Black—35
Quenching in Hg, E. Gaviola—1373

Scattering of electrons (see Electrons in gases)

Scattering of ions (see Ions)

Scattering of light (see also Raman effect)
By Kerr cell, A. Bramley —1061(L), discussion, J. Cabannes—1497 (L)

Scattering of radiation (see Raman effect, X-rays)

Sound (see Acoustics)

Spark discharge
Early stages, E. O. Lawrence, F. G. Dunnington—1624(L)
Mechanism,L. J. Neuman—550(A)
Phenomenon in rotary spark gap, R. E. Burroughs—161(L)

Specific heat
Air, constant pressure, O. C. Bridgeman—527
Be, E. J. Lewis—1575
Gases and mixtures of gases, theory, J. A. Beattie 1615—

Spectra, atomic
Al I, Ga I, In I, new terms, W. D. Lansing—597
C II, N II, additional series lines, I. S. Bowen—534
C II, N II, low energy states, I. S. Bowen—540
Cu I, Cu II, Mn II, in vacuum furnace, O. S. Duffendack, J. G. Black—35
Cu II, extension of analysis, G. Kruger—1122
Eu, Gd, Tb, Ds, Ho, furnace spectra, A. S. King—540(A)
Ga II, Ga I, In I, classification, R. A. Sawyer, R. J. Lang—712
Gd, by absorption of $GdCl_3$ crystal, S. Freed, F. H. Spedding—945
Ge II, Ge III, Ge IV, new terms and combinations, R. J. Lang—697
Hf, furnace, arc and spark, A. S. King—544(A)
Hg I, from 1 to 2μ, wave-lengths and classification, E. D. McAlister—1142
Hg II, III, IV, mean life, L. R. Maxwell—199
H, intensities as function of electron velocity, C. J. Brasefield—431
Hyperfine structure, interpretation, H. E. White 1404
Hyperfine structure, Paschen-Back effect, S. Goudsmit, R. F. Bacher—1499(L), 1501
Hyperfine structure, theory, H. E. White—1288(L)
Intensities of lines, vacuum furnace for measurements, G. R. Harrison—545(A)
Mg II, by impacts of second kind with ions and metastable atoms, O. S. Duffendack, C. L. Henshaw, M. Goyer—1132
Mg 4571 and 2852, effect of gases on intensity, J. G. Frayne—590
Mg 4571, effect of gases on intensity, J. G. Frayne—546(A)
Nebular forbidden lines, theory of intensity, J. H. Bartlett, Jr.—1247
N I, C I, classification, S. B. Ingram—421
N I, excitation, wave-lengths and classification, O. S. Duffendack, R. A. Wolfe—409
Ni I, analysis, H. N. Russell—821; note—1394(L)
O I, new terms, R. Frerichs—1239
Pb III, Tl II, analysis, S. Smith—393
Pb V, classification, J. E. Mack—17.
Pr^+, hyperfine structure, H. E. White—1397

Pt I, analysis, J. J. Livingood—185
Sb IV, Te V, extension of Cd I-like isoelectronic sequence, R. C. Gibbs, A. M. Vieweg—400
Theory of complex spectra, J. C. Slater—1293
Ti I, intensities in supermultiplets, G. R. Harrison—540(A)
Ti II, intensities in generalized multiplet, H. Engwicht—541(A)
Tl IV, classification, J. E. Mack—17.
Unusual spectral series, A. G. Shenstone—1623(L)
Vector coupling in Ni, Pd, Pt-like spectra, J. E. Mack—17
Zn, influence of A and H_2, J. G. Black, W. G. Nash, C. A. Poole—1138

Spectra, continuous
Of flames containing halogens, H. C. Urey, John R. Bates—1541

Spectra, molecular
AgCl, isotope effect, B. A. Price—1227(L)
Benzene and halogen derivatives, infra-red absorption, J. F. Daugherty—1549
CN, resonance-fluorescence phenomenon, H. T. Byck—453
CO and N_2, excited by positive ions and excited atoms, O. S. Duffendack, H. L. Smith—68
CO, comet-tail bands, L. H. Dawson, J. Kaplan—379(L)
CO_2, electronic bands, J. F. Duncan—1148
Diatomic molecules, rotational instability and uncoupling of electronic orbital angular momentum, W. W. Watson—1010
Diatomic molecules, wave mechanics, P. M. Morse—57
Diffuse, perturbation and predissociation, theory, a correction, O. K. Rice—1462
Doublet band, Zeeman effect, E. L. Hill—1507
Flames containing halogens, H. C. Urey, J. R. Bates—1541
Halogen derivatives of ethane, near infra-red, B. J. Spence, M. A. Easley—730
HCl, absorption, C. F. Meyer, A. A. Levin—44
HCl, analysis of bands, W. F. Colby—53
HCl, intensities in harmonic band, J. L. Dunham—438
He band lines, fine structure and Zeeman effects, R. S. Mulliken, G. S. Monk—1530
H_2, intensities as function of electron velocity, C. J. Brasefield—431
H_2S, infra-red absorption, A. H. Rollefson—604
H_2, theory of *B* state, C. Zener, V. Guillemin, Jr.—999
Li_2, alternating intensities, A. Harvey, F. A. Jenkins—1286(L)
MgH, Zeeman effect, G. M. Almy, F. H. Crawford—1517
Na_2, rotational structure, W. R. Fredrickson—207
N_2, excitation potential for negative bands, L. A. Turner, E. W. Samson—747
NH_3, vibration spectrum, J. W. Ellis—539(A)
NO, beta bands, J. Kaplan—165(L)
O_2, intensities in ultra-violet, theory, E. C. G. Stueckelberg—65
Organic nitrates, absorption in infra-red, E. K. Plyler, P. J. Steele—599
Ti O, new band system, analysis, A. Christy—539(A)

Spectra, Raman (see Raman Effect)

Spectra, X-ray (see X-ray, spectra)

Spectroscopy, technique
Secondary diffraction maxima of spectral lines, A. G. Shenstone—726
Use of series inductance in vacuum spark spectra, R. C. Gibbs, A. M. Vieweg, C. W. Gartlein—406

Sputtered films
Ni, properties, L. R. Ingersoll, J. D. Hanawalt—972

Statistical mechanics (see Mechanics, statistical)

Stefan-Boltzmann constant
Determination, C. E. Mendenhall—502

Surface tension
Hg, in gases, S. G. Cook—513

Thermal conductivity
Gases, new method, E. D. McAlister, H. J. Yearian—542(A)

Thermal expansion
Ta, P. Hidnert—544(A)

Thermal properties
Be, E. J. Lewis—1575

Thermionic emission of electrons
By cerium dioxide, effect of light, C. E. Berger—1566
From K, effect of hydrogen, H. R. Laird—463
From oxide-coated filaments, characteristics, J. A. Becker—1323
From oxide-coated filaments, influence of light, K. Newbury—1418

Thermodynamics
Compressibilities and thermal pressure coefficients of liquids, J. H. Hildebrand—649
Fugacities in gaseous mixtures, calculation, L. J. Gillespie—1605
Heat capacities of gases and gaseous mixtures, J. A. Beattie—1615
Intermolecular attractions in liquids, J. H. Hildebrand—542(A)
Joule-Thomson effect and C_p for air, O. C. Bridgeman—527
Of gases and mixtures, fugacities, L. J. Gillespie—352

Of liquids, intermolecular forces, J. H. Hildebrand—984
Thermoelectric effect
Bi, crystal grown in magnetic field, A. Goetz, M. Hassler—549(A)
Transition probabilities
In Na vapor, influence of method of excitation, C. J. Christensen, G. K. Rollefson—1157
Vacuum tube
Distribution of electrons between plate and grid, J. M. Hyatt—486
Valence
Of S, from x-ray absorption, R. Winger—548(A)
Vapor pressure
Of K, Rb, Co, K. T. Bainbridge—752
Wave-filters
Acoustical, theory, R. B. Lindsay—652
Wave mechanics (see Mechanics, quantum)
Work function (see also Thermionic emission)
Relation to contact potentials, for absorbed films on tungsten, I. Langmuir, K. H. Kingdon —129
X-rays, absorption
Dependence of frequency on chemical constitution, theory, L. Pauling—954
In crystals, effect of lattice energy, R. Winger —549(A)
Of S, relation to valence, R. Winger—548(A)
Pt and Au, *M*-series, A. J. M. Johnson—1106
X-rays, continuous
Intensity, quantum mechanical theory, C. Eckart —167; Y. Sugiura—858
X-rays, diffraction
By gratings, errors due to divergence, H. E. Stauss—1601
Of Cu and Fe for Mo and Cu radiation, A. H. Armstrong—931
X-rays, photoelectric effect
Direction of ejection, E. C. Watson, J. A. Van den Akker—547(A)
In gases, direction of ejection, C. D. Anderson —547(A)
X-rays, reflection
By calcite, B. Davis, H. Purks—181
Classical scattering, P. Kirkpatrick, M. Dewar —549(A)
From diamond, intensity, A. H. Armstrong—1115
From Pt films sputtered on glass, H. E. Stauss —1021
Of C $K\alpha$ from glass, E. Dershem—1015
X-rays, scattering
Fine structure in Compton effect, B. Davis, H. Purks—1
From Al and Cu, effect of temperature on Compton shift, G. E. M. Jauncey, H. Bauer—387
X-rays, spectra
Cd and In *K*-series, precision measurements, J. Valasek—1231
Components of $L\beta_2$ and relative widths of lines, S. K. Allison—176
Fine structure in Compton effect, B. Davis, H. Purks—1
Multiple excitation, R. M. Langer, S. B. Hendricks—544(A)
Pt and Au, *M*-series absorption, A. J. M. Johnson —1106
Relative intensities, S. K. Allison—7
Satellites of $L\alpha$, $L\beta_1$, $L\beta_2$, F. K. Richtmyer, R. D. Richtmyer—574
Zeeman effect
Effect of second order terms on susceptibilities of rare earth and iron group, J. H. VanVleck A. Frank—1494 (L); errata—1625(L)
In doublet band spectra, E. L. Hill—1507
In MgH bands, G. M. Almy, F. H. Crawford —1517
In He band lines, R. S. Mulliken, G. S. Monk —1530
In Pt I spectrum, J. J. Livingood—185